DOCUMENT RESUME

ED 145 940 PS 009 614

TITLE The Cornelius Project: Program Designs for Total Child Development.
INSTITUTION Charlotte-Mecklenburg Public Schools, Charlotte, N.C.
PUB DATE Aug 77
NOTE 23p.

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Academic Achievement; Cognitive Development; *Developmental Psychology; *Educational Innovation; Educational Strategies; *Elementary Education; Elementary School Curriculum; Learning Theories; Parent Participation; *Program Descriptions; *Program Evaluation; Reading Achievement; *Reading Development; Reading Programs; Staff Orientation; Teaching Techniques
IDENTIFIERS Cornelius Project; Formula Phonics Videotape Reading Chain Program; Guilfords Structure of Intellect; North Carolina (Charlotte)

ABSTRACT

This paper represents a first year evaluation of an innovative educational program instituted in 1976 in the Cornelius Elementary School, Charlotte, North Carolina. Designed as an attempt to meet children's developmental learning needs the project represents an attempt to put the developmental theories of Piaget, Bruner and other psychologists into practice. The project involved first familiarizing school personnel with the theory and principles to be applied, then designing a relevant curricular framework. The cognitive area, specifically reading development, was chosen as the focus of the first year program, and Guilford's Structure of the Intellect was selected as the theoretical perspective for the program. The Formula Phonics Reading Chain was chosen as the basic reading program because of its emphasis on reading as a problem solving process and because it encouraged small group, ungraded instruction. Staff and parent orientation and involvement were emphasized. First year results indicated significant gains in reading achievement for the Cornelius students at all socioeconomic and ability levels. Implications and suggestions for expansion and replication are discussed. (BD)

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THE CORNELIUS PROJECT

Program Designs for Total Child Development

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August, 1977

Foreword

As the Cornelius Project has ended its first year, two evaluation reports have been compiled to detail significant findings. The first report in the form of an abbreviated summary, written in a HEW format, is contained as a part of the total 1976-77 Emergency School Aid Act (ESAA) Basic Grant Evaluation. The second report which gives the background, a detailed description, the results, and the conclusions of the total project, is contained in this document and is intended for general use.

This project is an outgrowth of research and evaluation studies conducted by Shuford Smith, ESAA program evaluator. These observations indicated that curricula which was content centered only led to extensive remediation needs. Working with David Kimmelman, program coordinator, he developed a plan which would focus curricula on students developmental learning needs. This plan was implemented at Cornelius with the guidance of Gene Davis, principal.

Introduction

One of the most difficult tasks facing the American schools today is that of designing curricula that is appropriate for all children who may enter its doors. Although research is inconclusive, it may be hypothesized that a child's ability to learn is dependent upon his physical, biological, social, and mental maturation. Significant findings that have enhanced our understanding of the relationship of the learning process to child development have been made by educational theoreticians such as Jean Piaget. Piaget believes that a developmental perspective is necessary for one to understand human behavior. His approach involves the careful description and theoretical analysis of successive ontogenetic states. Other theoretical psychologists such as Bruner and Klasmeier have developmental models similar to the Piaget system which have been used successfully in the planning of learning experiences in the curriculum. Such curricula are not only appropriate for the level of development, but also help train various learning abilities.

Paradoxically, there is a dearth of application of this type of theory in face of enormous amounts of research data available. Investigations conducted into the many facets of child development and human behavior have uncovered valuable principles of learning, group dynamics, concept development, and emotional stability which should be useful tools to any educator. The major problem concerning educators is that very little of this information is being utilized systematically to improve the educational process.

In order for a school to convert curricular theory into practice, it must first have personnel who are knowledgeable of research-based principles, and secondly, the curricular framework through which those principles can be delivered.

It is not suggested that there is a panacea that would solve this problem. Rather, what is needed are attempts to provide staffs with these two elements which are necessary for them to become professional educators instead of technicians who merely follow the teacher's manual.

Such an attempt was begun during 1976-77 at Cornelius Elementary School in the Charlotte-Mecklenburg Schools, Charlotte, North Carolina. The overall plan was to very carefully develop an elementary school that would exemplify the best programs for total child development. Over a period of time, the school would be involved in applying certain theories of cognitive, psychomotor, and affective development through innovative curricula designs. As a result, all children would be continually evaluated to determine the degree to which they were fulfilling their potential. It was expected that as this school moved toward the ideals described above, the need for remedial programs would greatly diminish.

Description

The overall design of the Charlotte-Mecklenburg project encompasses three phases of implementation which were created to correspond to the cognitive, psychomotor, and affective areas. Each phase consisted of three stages: 1) Research and planning, 2) Implementation and evaluation, and 3) Replication and extensions.

The cognitive area was chosen as the focus of concern for the first year. Historically, schools have offered content curricula.

Though most of these offerings did involve cognitive processes, the specific content always took precedence over the process. Therefore, the most pressing concern was to have all content flow from the cognitive processes needed by children in their developmental stage rather than just arbitrarily offering the content.

The content chosen to be restructured was reading, since this is the basis for learning the content of all curricular areas, as well as being the area in which more cognitive actions are involved.

Subsequently, the first year, 1976-77 included both Stage 1, the research and planning necessary to fulfill the objectives, and Stage 2, the actual implementation and evaluation of that effort.

As a result of a review of the pertinent research, two major elements were selected for introduction to the schools faculty. The first was a theory of thinking and cognitive operations that is more broadly based and generally applicable than any other. That theory, Guilford's Structure of Intellect, had been applied to education by Dr. Mary Meeker and the SOI Institute.

Tests, curricula materials, and teacher information packets had been developed to help translate the theory into a practical form.

The second element involved finding a reading program which treated reading as a process rather than as a subject, which

promoted quality teacher-pupil interaction, which could accomodate every type of student and learning style, and which had a documented record of success. Only one program was found which met all of the criteria--the Formula Phonics Reading Chain.

The next part of Stage 1, Phase I was to plan how this research was to be implemented. The selection process resulted in choosing Cornelius Elementary as the project school for several reasons. First, it reasonably typified the "average" K-6 school in the local system in terms of achievement scores, size, faculty, and socio-economic class. Secondly, of all the schools which had expressed an interest, the principal and staff at Cornelius seemed most ready to begin immediately. A timetable was set up to include summer workshops, material requisitions, and parent involvement.

For one week during the summer and during the teacher work-days, workshops were held for the faculty to lay the SOI theoretical groundwork necessary for implementation. The first direct activity with students was to assess their cognitive strengths and weaknesses using the SOI Learning Abilities Test. Profiles and prescriptions were developed for each child to guide teacher action throughout the year.

However, the reading-thinking component which is the core of this year's implementation needs far more elaboration. As mentioned earlier, the Formula Phonics Reading Chain was the structure chosen to guide the staff. This structure is built with two major thoughts: first, reading is conceptualized as a tool used in processing; secondly, proper application of this tool requires an effective delivery system.

The first thought, i. e. treating reading as a processing tool rather than an academic subject, leads to several implications.

Reading is treated in the Formula Phonics program as a problem-solving process. In order to effectively problem solve, students and teachers work together in dialog groups to delve deeply into the chosen literature. Written works selected for the dialog thus must be of high quality and appropriate for that group's language needs.

To make such an approach effective, all participants learn a systematic word attack process--the formula--which when mastered allows them to close on 90% of all words in the English language. Since mastery of that process occurs in natural contextual reading, contrived drill becomes unnecessary. In addition, spelling then becomes a natural investigation of the applicable phonetic principles instead of pure memory exercises.

Experience has shown that students very rapidly--within months--need less and less decoding episodes and move rapidly into vocabulary and comprehension building. The dialog group works on these areas once again using a problem solving technique. This clarification process requires the students to state their problem, detail the knowns and unknowns, generate possible pathways that could provide the missing information, select a pathway and pursue it, try the solution back in context, and decide on possible uses for or extensions of the solution. This procedure leads the dialog teacher and the group into many areas of exploration.

In addition to funding the children with better vocabulary and comprehension strategies, it gives them a process useful in the learning of almost any subject or in dealing with any life decision.

To insure the effective delivery of such a program, a five-part system is utilized: Video programming tapes, a dual ungraded chain, staff development activities, parent involvement, and a skills management system. The video programming for both teachers and students provides some common antecedent conditions so that all have similar vocabularies and insights into the decoding process. Then the natural reinforcement needed for internalization can occur in the dialog groups in the amounts necessary for each student. The video format also allows a smooth transition for new students into the program as they receive the common background before being assigned to a dialog group.

A dual ungraded chain was made possible first by staggering the school day. Staggering provided small groups by having half of the students receiving their dialog time when they arrive in the morning, the other half before leaving in the afternoon. The ungraded portions of the chains insures that the students will be involved with groups that have similar reading needs rather than similar ages. The chain also provides rotation every five weeks with teachers moving down the chain and students being regrouped upward as necessary.

Staff development activities include each dialog teacher being relieved twice during every five-week period to "walk-through" the chain. This action provides a chance to learn from observing

other groups. Every two weeks a staff development dialog occurs when these walk-throughs are discussed and better practices are synthesized.

Parents are involved at several levels, the most intense being a total workshop training them with the video tapes. Also, a large quantity of information is sent to all parents describing the program in general as well as their own child's strength, weaknesses and progress. The more usual individual conferences, PTA meetings, and community newspapers are also employed extensively.

At the end of the implementation part of Stage 2, an in-depth evaluation was required. The procedures and results of that evaluation are given in the next section.

A skills management system is now also used being the natural outgrowth of the instructional program (See Attachment). Only those few skills found to be necessary for success in the Formula Phonics program were identified for measurement. Students with specific difficulties can thus be given additional help in addition to dialog if it's necessary.

The reading program thus integrates and synthesizes much of learning theory and small group dynamics research into a viable, manageable system. As a result, quality teacher-pupil interaction becomes more and more prevalent throughout the total school.

Results

I. Instrument

Reading achievement data was gathered using several levels of the Comprehensive Test of Basic Skills (CTBS), Form S, Reading Section as the pre/post measure. The pre test was administered in September, 1976, and the post during the first week of May, 1977. The schedule produced an eight month or 0.8 school year interval between the tests.

II. Methodology

A. Statistical:

In all computational work the Expanded Standard Score (ESS) of the CTBS was utilized. Grade Equivalents, where shown, are conversions from the ESS using CTBS tables. There are several advantages to this method which are elaborated in the CTBS Test Coordinators Handbook. One important effect has been to give a more realistic view of change. If one uses "grade equivalents" a few unusually large gains can make class changes look greater than they actually are. Also, using ESS allows both a cross grade level and longitudinal analysis of material learned.

B. Procedural

One decision made during implementation was that no written work utilized this year either in homeroom or dialog would resemble the format of the CTBS. During this first year, it was felt that for the results to show a significant improvement in reading, that extraordinary care should be taken to assure that the data was not just a reflection of improvement in multiple-choice test taking ability.

III. Data Report

Much data has been collected and analyzed with four major findings emerging. This section will deal in some detail with the patterns found that clarify each of the findings. The four findings are:

- The average difference in total reading scores for the 321 second through sixth graders participating in the program was significantly higher than would be expected in a "normal" classroom.

- Three-fourths of the participating students made at least one months progress for every month in the program.

- The non white population who started at a lower point and according to "IQ" scores had low potential achieved as well as the "normal" standardized group - far above usual expectations.

- The first grade, by articulating the program downward, produced a group whose average is already above grade norms.

A. The Average Difference

A total of 321 students were enrolled during the entire year and their pre/post scores are used in the following results. All "special category", such as EMR and LD are included.

1. School Summary (Total Reading)

Gain = +1.3 years (during 0.8 year interval)

During the last ten years, the mean "IQ" of the groups of students attending Cornelius has ranged from 96 to 101. All of the grade levels currently enrolled continue that pattern. With that base, one should expect that the average reading growth would approximate one month gain for one month's instruction. In fact, the achievement scores during the past ten years were only at best equal to that rate, while often falling below it. However, during this current eight month interval with the new program, the average growth has jumped to 1.6 months gain for each month of instruction; a significant change.

2. Grade by Grade Summary (Total Reading)

Table 1

Grade	Difference (ESS)		Post Test (ESS)		PreTest (ESS)		"IQ"
6th (N=62)	+1.4	(51)	6.2	(475)	4.8	(424)	98
5th (N=71)	+0.9	(30)	5.2	(438)	4.3	(408)	97
4th (N=61)	+1.4	(57)	4.9	(428)	3.5	(371)	98
3rd (N=60)	+1.1	(57)	3.7	(379)	2.6	(322)	101
2nd (N=67)	+1.0	(63)	2.8	(335)	1.8	(272)	-

Particular emphasis should be placed on the Expanded Standard Scores, the numbers shown in parenthesis in Table 1. The ESS points in reading are more compressed in the lower grade equivalents. Since there is more reading knowledge to be learned in the earlier years, more of these scale score "points" have to be located in that area. Looking at the table one can see that with the exception of the 5th grade, all grades gained at least 55 points in ESS . So, even though the 2nd grade actually gained more in ESS than did the 6th grade, their grade equivalent jump was less. However, if this rate of gain in ESS is maintained, (and that's the reason for a 2-6 ungraded chain), then the grade equivalent jumps will become even more dramatic as these students get older.

The 5th grade showed the least gain - just over one month growth per one month instruction. Special emphasis next year will be placed first on closely monitoring several of these students and secondly on analyzing the 5th grade curriculum. However, much of the less than sensational test results are thought to be in the test taking ability of these students rather than the reading ability.

3. Upper Quartile Compared to Lower Quartile

Table 2

Quartile	Difference (ESS)	Post (ESS)	Pre (ESS)	"IQ"
Upper (N=79)	+1.5 (44)	7.0 (494)	5.5 (450)	112
Lower (N=79)	+0.6 (63)	2.3 (313)	1.7 (260)	85

Once again special attention is called to the difference in Expanded Standard Scores. As was explained earlier though ESS does reflect a gain in reading knowledge, there is less of a grade equivalent change for a group which begins at a lower level. What is so promising is that the lower quartile's gain in knowledge was equal to all other groups, and providing that rate continues, they will show phenomenal grade equivalent growth as they move up the competency ladder.

B. The Students' Individual Gains

Average gains while sometimes impressive, often hide the fact that a few spectacular jumps account for the change while many students do not significantly improve. 75% (240) of the 321 students achieved at least one months gain for every month of instruction. This rate gives some confidence that children were actually learning significant amounts of new skills and not just improving their scores by chance.

Figures 1 through 5 show the pre/post histograms of each grade level. The frequency distribution is substantially shifted to the right. This shift of top end scores is indicative of the freedom given students from a lock step curriculum.

Figure 1
2nd GRADE -- TOTAL READING

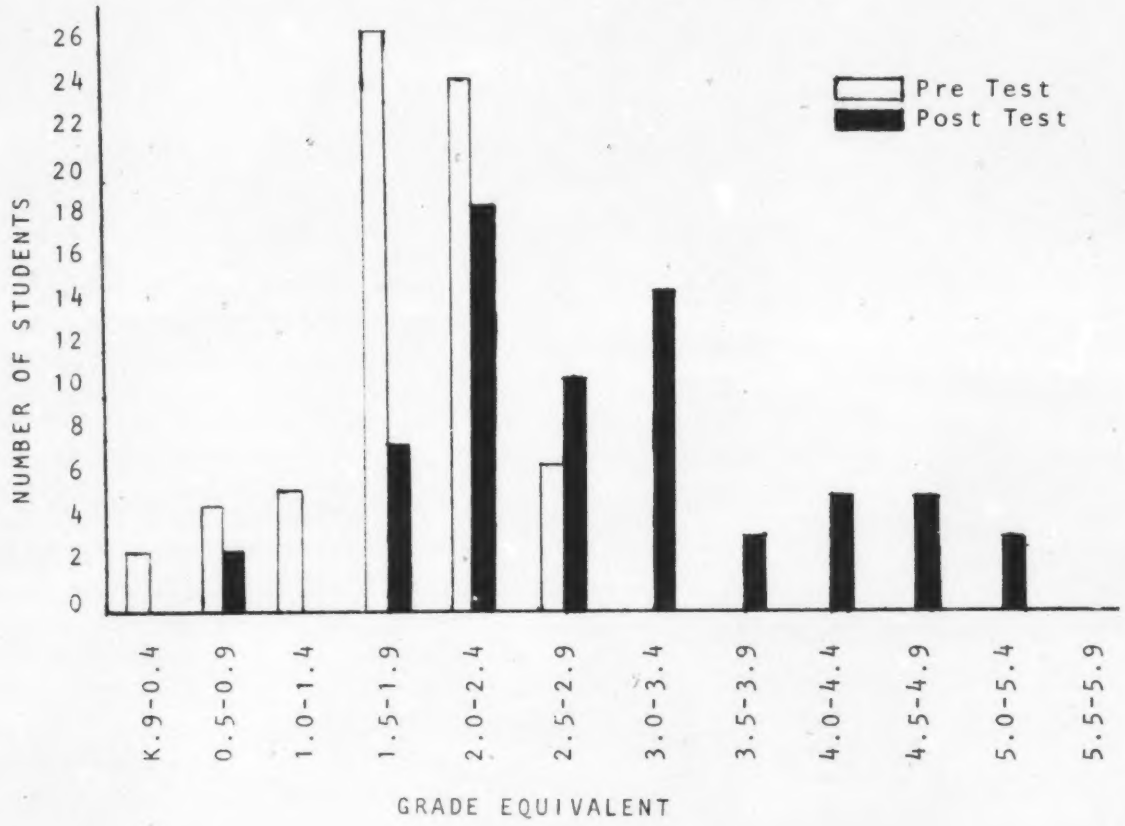


Figure 2
3rd GRADE -- TOTAL READING

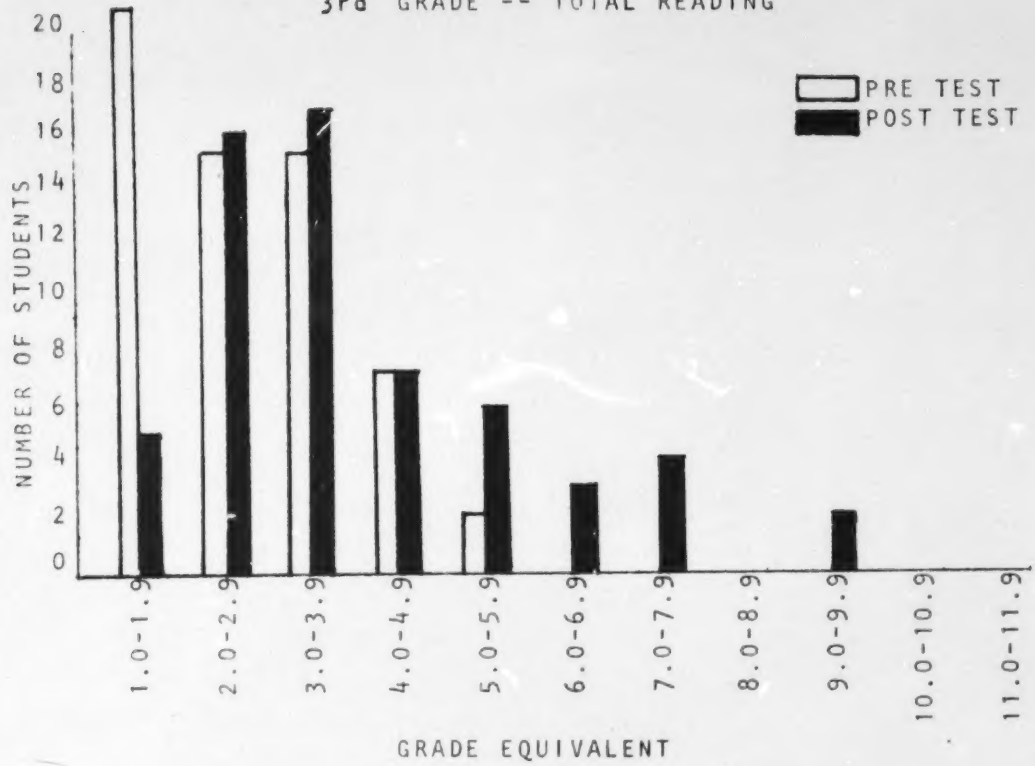


Figure 3
4th GRADE -- TOTAL READING

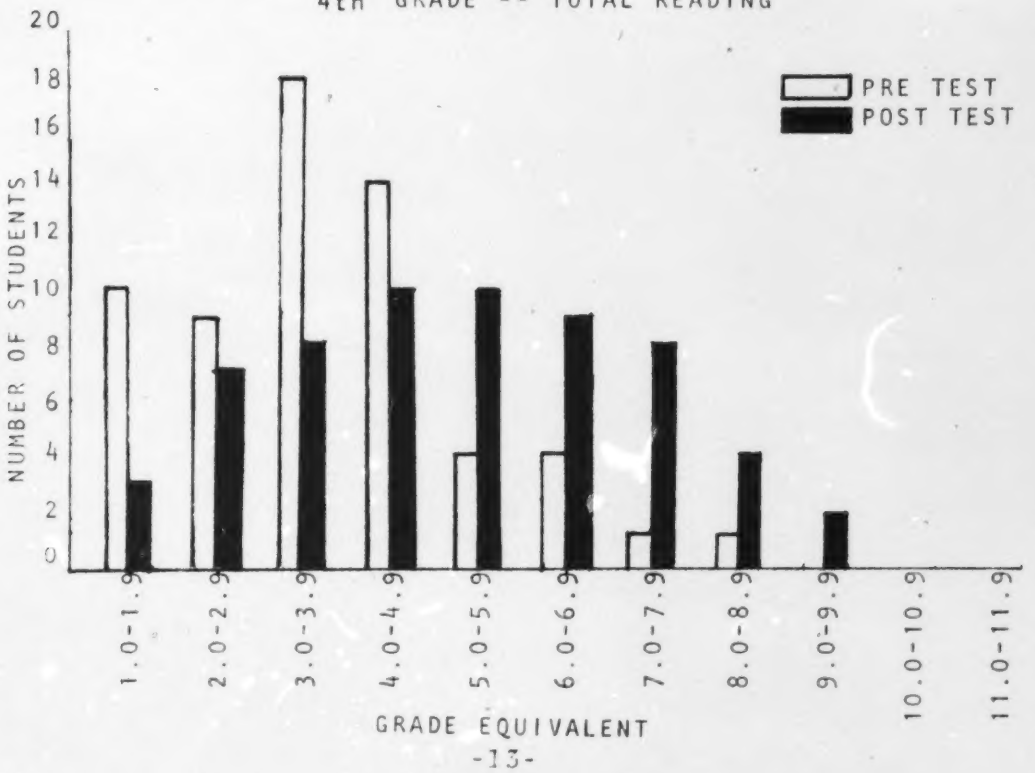


Figure 4
5th GRADE -- TOTAL READING

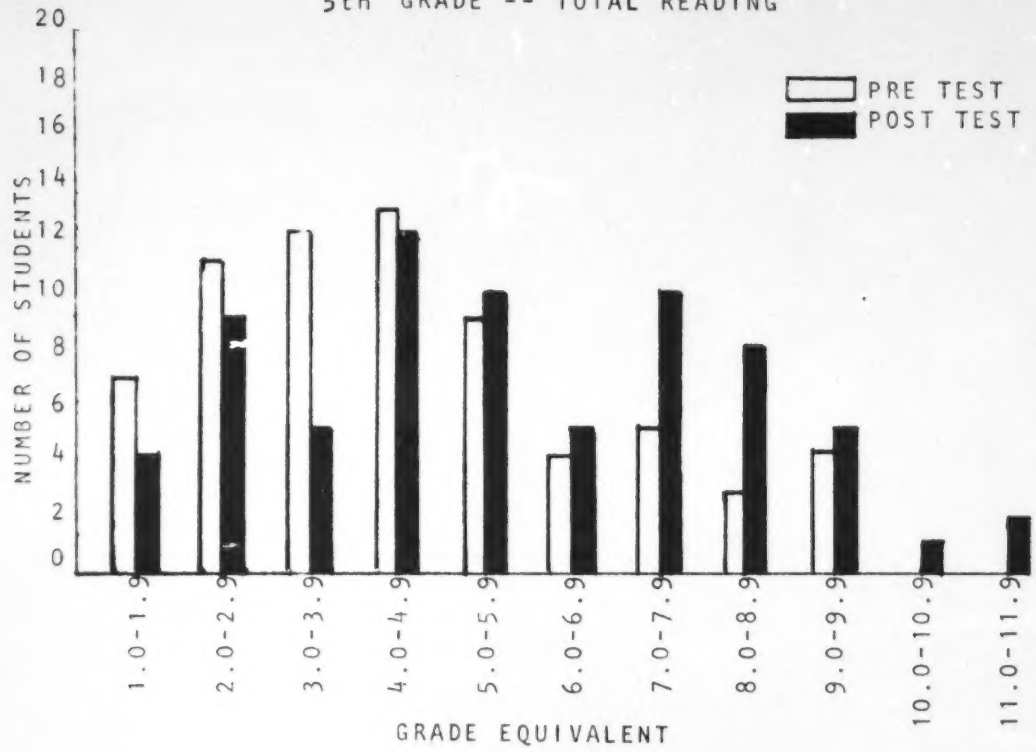
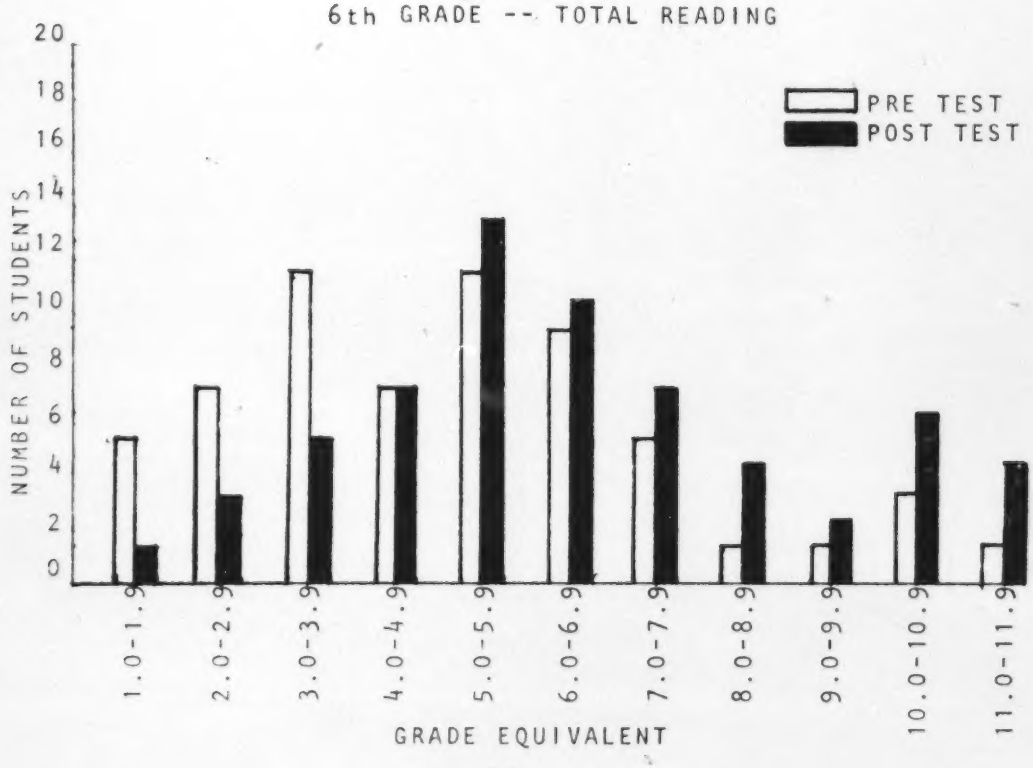


Figure 5
6th GRADE -- TOTAL READING



Finally, one must address the most severe test of the students' demonstrated gain. That test concerns itself with whether the students improved their status as compared to the measured growth of the nationally standardized group. In Figure 6, the pre/post measures of the Cornelius group have been superimposed on the growth curves of the standardization sample. One can readily observe that in all grades, the growth rate exceeded that of the mean of the sample with the exception of the 5th grade. The 5th graders simply matched the mean growth rate. Also notice that in every case the starting points for next year already exceed the starting points of the current year. Thus the coming year is provided with a much stronger base on which to build.

For those interested in the statistical analysis of this improved rate, the procedure for the norm referenced model as detailed by Horst, Tallmade, and Wood in A Practical Guide to Measuring Project Impact on Student Achievement was followed. When using either the standard deviations of the appropriate CTBS levels or the Normal Curve Equivalent values, all grades except the 5th made significant educational gains over what would be expected.

Figure 6

Growth Chart

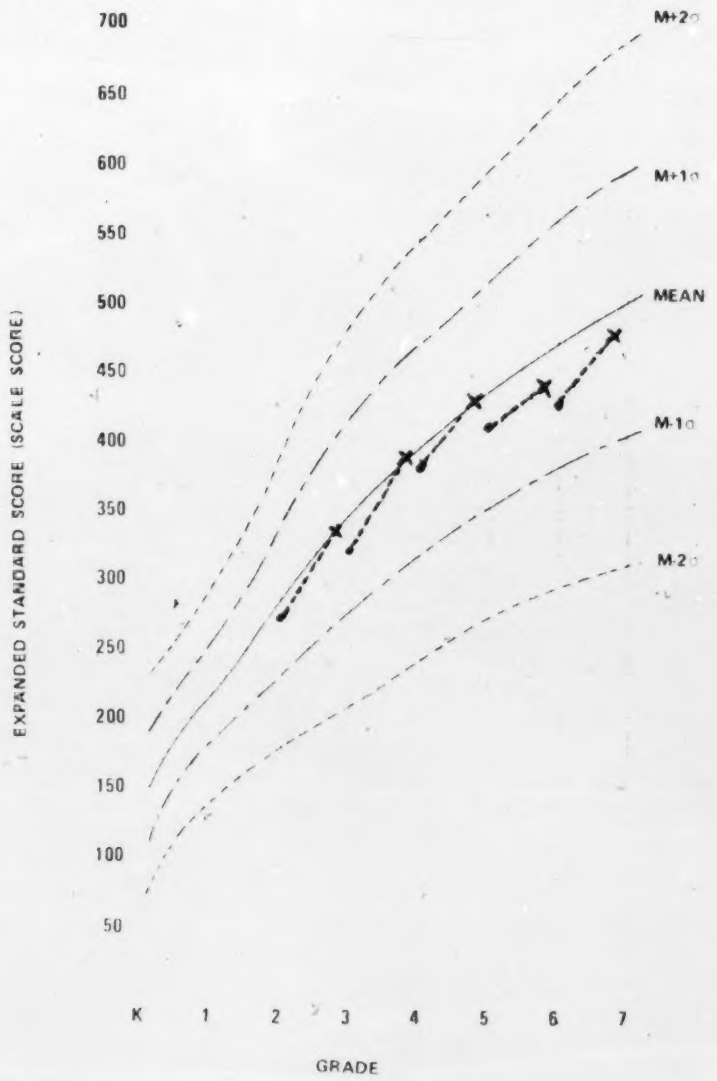
USING EXPANDED STANDARD SCORES (SCALE SCORES)

CTBS
FORMS S, T

TOTAL READING

LEVELS A, B, C, 1, 2, 3, 4
Level A data refer to Total Prereading

Comprehensive Tests of Basic Skills
Expanded Edition



C. The Non White Scores

Cornelius not unlike almost any other small, rural Southern town, draws its non white students from a lower socio-economic class than the white students. Minority students have therefore, tended to achieve on a much lower level, especially when measured by nationally standardized tests. Table 3 shows the Non White groups results.

Table 3

	Difference (ESS)	Post (ESS)	Pre(ESS)	"IQ"
Non White (N-88)	+0.8 (37)	3.1 (349)	2.3 (312)	86

The average gain for these 88 students was one month in reading for every month of instruction , equal to the"average"group nationwide. Two points need to be emphasized. First, this rate of progress significantly exceeds the "normal" growth expectations for a group which has both a mean "IQ" of 86 and which comes predominately from a low socio-economic class. Secondly, the gain in ESS points, as was detailed throughout this report, translates to a lower grade equivalent gain when the pre test average is in the primary grade range. However, by maintaining this new rate over time, even more substantial grade equivalent jumps will occur.

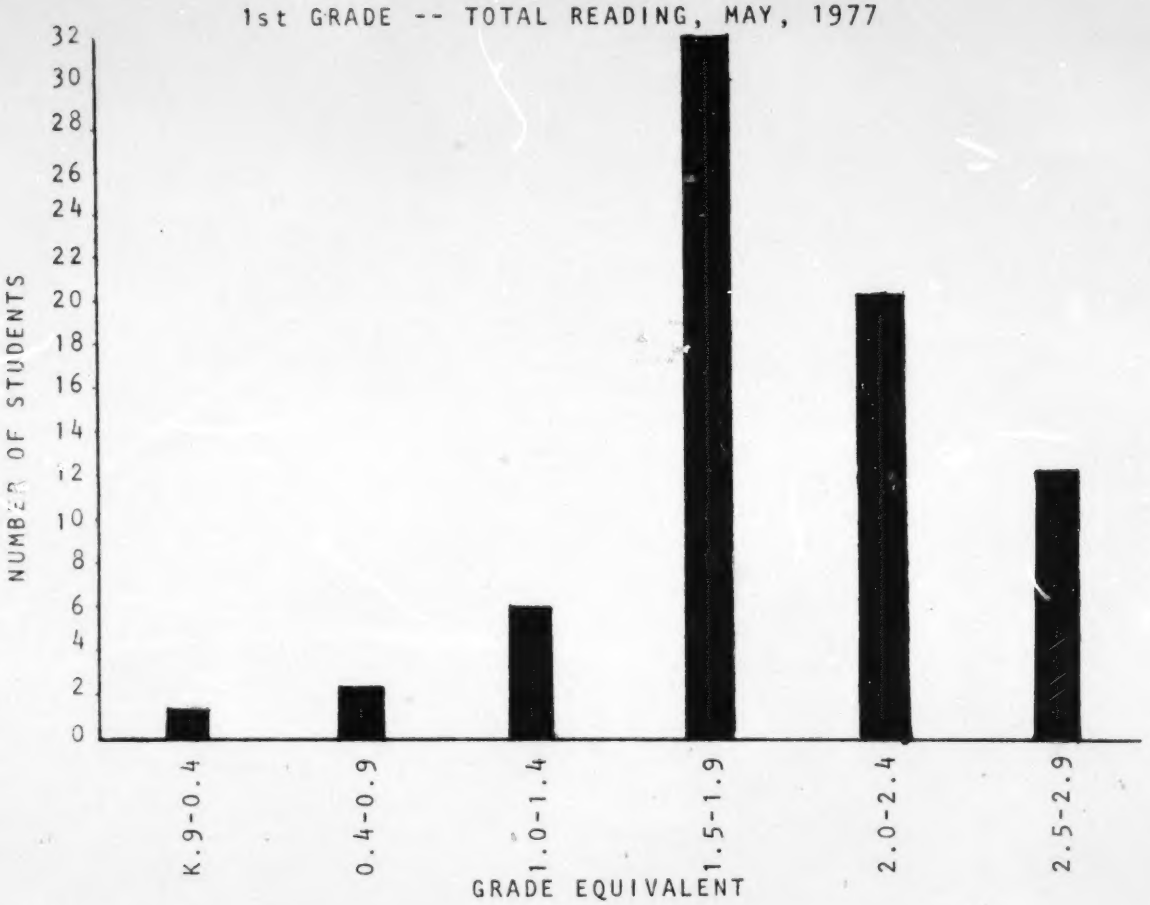
D. First Grade

Though the First grade was not officially a part of the 2-6 ungraded chains, and did not utilize the video tape programming, these three teachers articulated all parts of the program into their classrooms. Though no pre-testing was done, it was felt that post-testing might at least provide for the rest of the staff, a picture of the upcoming student's reading foundation.

The mean score for the 75 first graders was 1.9 - slightly above the national norm. Figure 7 shows the frequency distribution of these students.

Figure 7

1st GRADE -- TOTAL READING, MAY, 1977



The one child who scored in the non reading area was a very young child, with no kindergarten experience and who will be retained as a result of parent and teacher agreement. The next two students who were in the primer range are repeating first graders that have made substantial progress in establishing a good foundation. Most importantly, 87% of the students are virtually at or above grade norms.

Conclusions and Recommendations

As has been documented in the Results section, reading has significantly improved among the students.

The average gain of 1.3 years during an 8-month program far exceeded the record of the last ten years at Cornelius. This new rate was significantly better than the expectations of any student body with a similar socio-economic and ability background. When an equal interval scale (the ESS) was used to measure growth, it was observed that all groups including the lowest in the school made exceptional progress. If this phenomena continues, the profile of achievement at Cornelius will radically change.

Yet, perhaps the most significant conclusion that can be drawn at this point of the cognitive phase involves the changes that have occurred which are not easily measured. By teaching reading as problem solving, one is infusing the students with thinking strategies that transcend the subject of reading. Already in the dialog groups, one can observe a radical improvement in the way information is processed. Therefore, the traditional reading tests measure only the tip of the iceberg and to some extent the least important. The students are not the only ones affected, for simultaneously, as the focus in dialog becomes less and less centered on decoding episodes, and more and more on processing information, the teachers also change strategies. The Cornelius faculty is rapidly becoming more adept at questioning and involving the students at several levels of thinking. These techniques obviously carry over to all content areas with very positive results.

All of the above accomplishments were made possible without the use of extensive materials or additional staff. Rather the effect was one of concentrated faculty effort and solid concepts implemented through an effective delivery system. Focusing the efforts of a faculty appears to greatly increase the learning efficiency of a student body.

For the future, several steps need to be taken if the plan is to progress beyond its current level. First with the removal of ESAA funding for the 1977-78 year, there is no sponsoring department. Such an assignment needs to be made and resources released to enable a quality continuation. Secondly, to solidify and expand the impact of the reading-thinking component, Stage 3 of Phase I should begin. It is time to extend and replicate the above results in other schools.

This action will make available to other students who desperately need help, a reading program which has now proven itself locally to be extremely effective. Also, the involvement of another faculty concurrent with the continued staff development at Cornelius will provide a cross-fertilization of ideas that will result in a better process and a better product.

As a part of Stage 3, certain extension activities can be taken at Cornelius to further enhance the development of the cognitive domain. Such projects to be included would be to improve total language development, a poetry section devised locally by Genie Ball of the English Department, a new method of developing awareness and use of syntax evolving from an ESAA study, and improved creative writing exercises. Extension into the symbolic

area of the cognitive domain, that is, the mathematics curriculum, also should be instituted. DIGIT, a developmental math program based on Bruner and Piaget processes and coded to an SOI format, can be made available by its developer, Patterson Road School, for replication at Cornelius.

In addition to enriching Phase I next year, it would seem profitable to begin the research and planning stages of Phase II and III. Thus, by the end of the second year of the plan, a clearer awareness would be available of the scope and feasibility of the total project, in addition to having a very solid foundation in the cognitive domain.

This report concludes the first year of a plan to develop, locally, a school whose faculty would be trained in developmental theories and would change their curricula to correspond to those theories. The results indicate that indeed children were significantly helped in those areas chosen for restructure. There is every indication that this direction is fruitful and of great benefit to all involved. It should be continued and accelerated.